Risk Assessment Methodology for Transmission^{SM} – One-Week Training Course

The one-week Risk Assessment Methodology for Transmission (RAM-T^{SM}) training course employs classroom training and field experience to familiarize the student with the RAM-T^{SM} process. The first two days of classroom training comprise 17 learning modules that provide the theoretical underpinnings of security risk assessment and 12 practical exercises that provide the student with application experience. For the next two days of the class, the student teams are guided by the instructors through an example assessment exercise, performed in the field on an actual facility. The final day of the class includes student team presentations, instructor critiques, and a summary review.

These twelve classroom modules and their associated learning objectives are outlined below, followed by an outline of the RAM-T^{SM} example assessment schedule, and the final day tasks. (The bold numbers indicate the Field Manual section cross reference.)

DAY 1

1.0 Introduction Using the RAM-T^{SM} field manual and workbook, the student will be able to accurately describe the history and purpose of the RAM-T^{SM} process and why a security risk assessment methodology for dams is needed (**1.1** and **1.3.1.1)**, the benefits of using RAM-T^{SM} (**1.2**), and identify the three elements of the risk equation (**1.3**).

2.0 Project Definition Using the RAM-T^{SM} field manual and workbook, the student will be able to accurately identify their mission requirements-based, agency-specific statements of work and their unique project requirements and budgetary constraints, determine project mission goals and purpose, and identify critical skills to complete the assessment team.

3.0 Screening Using the Screening Worksheet and the Screening Summary Worksheet of Undesired Events vs. Consequences, the student will be able to accurately differentiate between those dams that need a full risk assessment and those that do not. *This module includes an exercise*.

4.0 Planning Using the RAM-T^{SM} field manual and workbook, the student will be able to accurately:

- **4.1** Assemble existing project-specific information (such as engineering drawings and safety analyses).
- **4.2** Adapt the Generic Transmission Fault Tree to represent the specific project. *This module includes an exercise.*
- **4.3** Assess the potential threats to and adversaries of the project. *This module includes an exercise.*

4.4 Assess the consequences of undesired events used in 3.0 Screening and revise/refine, if necessary. *This module includes an exercise.*

4.5 Prepare for the site survey to include identifying the information to be collected during the site survey. *This module includes an exercise.*

5.0 Site Survey Using the RAM-T^{SM} field manual and workbook, the student will be able to accurately verify that all logistics for the site survey have been addressed and identify the three critical steps for a successful site survey. *This module includes an exercise.*

6.0 Analysis Using the RAM-T^{SM} field manual and workbook, the student will be able to accurately:

6.1 Construct adversary scenarios and sequence designs, identify the specific most vulnerable scenario to be applied to the current security system, and determine the effectiveness of the current security system in place. *This module includes an exercise.*

6.2 Calculate the risk value for various adversaries to accomplish high-priority undesired events using the Risk Equation. *This module includes an exercise.*

DAY 2

6.3 Determine whether or not the calculated values of risk are acceptable to the management of the project. *This module includes an exercise.*

7.0 Reduce Risk Using the System Vulnerabilities Summary Worksheet and the Reduce Risk Worksheet, the student will be able to accurately identify the three critical elements of an effective protective system, suggest upgrade package or packages to address identified vulnerabilities for undesired events (see also **Appendix D**), evaluate adversary sequence diagrams, calculate risk for each upgrade package, and establish Design Basis Threats for upgraded packages. *This module includes an exercise.*

8.0 Evaluate Impacts Using the Impact Worksheet, the student will be able to accurately evaluate the impacts of implementing an upgrade risk reduction package. *This module includes an exercise.*

9.0 Final Report Using the RAM-T^{SM} Product Summary, the student will be able to accurately assemble a final report that documents the risk assessment for presentation to management. *This module includes an exercise.*

At this points a brief review will be provided and any remaining questions will be addressed before proceeding to the example assessment of the selected transmission facility, such as a substation or control center..

Assessment of Selected Facility

Students are broken out into teams to perform RAM-T^{SM} security risk assessments of the subject facility with the guidance of the instructors. This provides a hands-on experience with using the RAM-T^{SM}. Note that the Planning activities can all occur in the classroom setting. Existing materials such as engineering drawings, lessons learned incident reports, and the like can be assembled by the facility staff for this purpose.

4.0 Planning – Each team will use available information to characterize the facility (**4.1**) as completely as possible, noting questions that cannot be resolved until a site survey is performed later. Each team will then customize the generic fault tree to reflect the characterization of the subject facility (**4.2**). The teams will next assess the threat (**4.3**). (In many instances, the facility owner has previously defined the threat, in which case it will be given to each team.) The teams will then assess the consequences of the occurrence of mission-threatening undesired events at the subject facility (**4.4**).

The class reconvenes and each team presents a short briefing on their Planning activities. Instructors will resolve any discrepancies among the groups.

DAY 3

The teams will convene in the classroom.

4.0 Planning (continued) – Each team will finish the Planning step by selecting the appropriate worksheets for the survey of the subject facility (based upon the customized facility-specific fault tree). The team will the complete as many worksheets as possible with the available information, making note of the information to be gathered at the site.

5.0 Site Survey – The missing data from the facility-specific worksheets are collected during a site visit. An all-teams meeting is convened at the site (if possible) to resolve unanswered questions, consider discrepancies, and discuss any problems that arose during the survey.

DAY 4

The teams will convene in the classroom.

6.0 Analysis – Each team will construct adversary scenarios and sequence designs, selecting the most credible and damaging examples. The worksheets are completed to assess the effectiveness of the existing security system against these selected scenarios (**6.1**). Using the Risk Equation, the team then calculates the risk value for each adversary under consideration accomplishing each high-priority (medium or high consequence) undesired event (**6.2**). A determination is then made whether the calculated risk values are acceptable (**6.3**).

7.0 Reduce Risk – For each calculated risk value determined to be unacceptable and so recorded on the System Vulnerabilities Summary Worksheet, the Reduce Risk Worksheet shall be completed (see also **Appendix D**). Suggested upgrade packages will be identified, evaluated, and risk reduction (if any) determined. Teams will reconsider the Design Basis Threat for the upgrade packages.

8.0 Evaluate Impacts – Each team will complete an Impact Worksheet for each recommended upgrade package to accurately evaluate the impacts of implementing an upgrade risk reduction package.

9.0 Final Report – Using the RAM-T^{SM} Product Summary, each team will assemble a final report that documents the risk assessment for presentation to management.

DAY 5

The teams will reconvene in the classroom.

Team Presentations – Each team will brief the group on their findings and recommendations, using the Product Summary.

Critique – The instructors will provide critiques of the presentations, resolving discrepancies and clarifying process instructions as necessary.

Questions, Answers, and Discussion – Students and instructors will consider any problems encountered in learning to use RAM-T^{SM}.

Summary Review – Instructors will provide observations on the effectiveness of the course and remind students of the purpose of the RAM, which is to balance the costs of upgrade packages or consequence mitigation suggestions against the benefits of risk reduction.

Course Evaluation – Students are asked to complete evaluation forms.